

PROPOSED LIST OF RARE AND/OR ENDANGERED LICHENS IN MICHIGAN

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ABSTRACT

Thirty-four species of macrolichens are considered to be rare and/or endangered in the state of Michigan, with nine being critically endangered. Twenty-five have been recorded from only the Upper Peninsula, seven from only the Lower Peninsula, and two from both peninsulas. Thirteen have been recorded from only Keweenaw County (Isle Royale National Park), but these are considered to be less threatened than the species recorded from only individual or scattered localities elsewhere in the state.

INTRODUCTION

Michigan has an extensive and diverse lichen flora (Fryday et al. 2001). However, although some taxa are known from only a single record in the state, and some are known from nowhere else in North America (Fryday 2001) or even the world (Timdal 1992), none has any legal protection. Based on fieldwork in the Great Lakes region, and the extensive collections in the herbarium of the University of Minnesota (MIN), the second author prepared lists of potentially threatened lichens in Minnesota, Wisconsin, and Michigan. In the summer of 2000, he visited the herbarium of Michigan State University (MSC), and together we revised the list for Michigan by incorporating data from MSC. The final list was completed by including data from the herbarium of the University of Michigan (MICH), obtained during the compilation of the *Checklist of Lichens and Allied Fungi of Michigan* (Fryday et al. 2001).

The final list presented here (Table 1) includes 36 species of macrolichens that are known from five or fewer records from the state of Michigan and that we believe to be threatened in the state. Within these, we have further identified nine species that we believe are critically endangered.

DISTRIBUTION AND RARITY

The lichen vegetation of Michigan is composed of three main elements; species with either a northern, eastern, or Appalachian/Great Lakes distribution. The distribution patterns of other species are unclear because they are known from only scattered records, or their occurrence is too patchy for distribution patterns to be inferred. More detailed distribution patterns for most of the species included here are given by Brodo et al. (2001)

Northern—typically species with a circumboreal distribution. Northern Michigan represents the southern edge of their range and they are often common and widespread further north (e.g. *Arctoparmelia* spp., *Flavocetraria cucullata*, *Umbilicaria* spp.).

Eastern—terricolous or corticolous species, usually of dry habitats, for which Michigan represents the northeastern edge of their range. Some are widely distributed in the Northern Hemisphere (e.g. *Teloschistes chrysophthalmus*), whereas others are apparently restricted to North and South America (e.g. *Cladonia robbinsii*).

Appalachian/Great Lakes—usually species of humid deciduous woodlands, where their presence indicates an area of old-growth forest. Most are widely distributed, but rare, in the Northern Hemisphere, (e.g., *Sticta fuliginosa*), although *Anzia colpodes* and *Sticta beauvoisii* are apparently endemic to North America.

Within Michigan, there is a distinct division of the species on the proposed list between the Upper and Lower Peninsulas (Table 1). Twenty-five of the 34 species have been recorded from only the Upper Peninsula and two more have been recorded from only the Upper Peninsula and either Emmet or Cheboygan

TABLE 1. Proposed list of potentially threatened lichen species in Michigan.

Recorded from both Upper (Keweenaw Co.) and Lower Peninsulas			
<i>Physcia phaea</i>	(A/GL, N, W)	<i>Ramalina farinacea</i>	(W coast, scattered E)
Recorded from only the Upper Peninsula			
Recorded from only Keweenaw Co.		Not recorded from Keweenaw Co.	
<i>Arctoparmelia subcentrifuga</i>	(N)	<i>Anzia colpodes</i>	(E)
<i>Collema glebulentum</i>	(N)	<i>Hypogymnia vittata</i>	(N)
<i>Collema polycarpon</i>	(W)	<i>Sticta beauvoisii</i>	(W, scattered C & E)
<i>Flavocetraria cucullata</i>	(N)		
<i>Hypogymnia bitteri</i>	(N)	Recorded from Keweenaw Co.	
<i>Lobaria scrobiculata</i>	(scattered N & A)	<i>Arctoparmelia centrifuga</i>	(N)
<i>Melenelia tominii</i>	(W)	<i>Dermatocarpon moulinii</i>	(W)
<i>Peltigera venosa</i>	(N)	<i>Heterodermia leucomela</i>	(A, W coast)
<i>Pseudocyphellaria crocata</i>	(E & W coast, A/GL)	<i>Hypotrachyna revoluta</i>	(scattered)
<i>Punctelia stictica</i>	(scattered W & S)	<i>Melanelia panniformis</i>	(N)
<i>Stereocaulon pileatum</i>	(E)	<i>Protopannaria pezizoides</i>	(N)
<i>Sticta fuliginosa</i>	(A/GL)	<i>Psora decipiens</i>	(N & W)
<i>Umbilicaria polyphylla</i>	(N)	<i>Ramalina thrausta</i>	(W, scattered C & E)
<i>Umbilicaria torrefacta</i>	(N)		
Recorded from only the Lower Peninsula			
<i>Cladonia robbinsii</i>	(E)	<i>Peltigera scabrosa</i>	(N)
<i>Cladonia strepsilis</i>	(E)	<i>Teloschistes chrysophthalmus</i>	(C)
<i>Heterodermia obscurata</i>	(S & E)	<i>Teloschistes flavicans</i>	(E & W coasts)
<i>Melanelia albertata</i>	(W & C)		

Key to North American Distribution Patterns:

N - Northern	C - Central
S - Southern	A - Appalachian
W - West	GL - Great Lakes
E - East	

TABLE 2. Michigan counties from which threatened lichen species have been recorded. * = no specimen in MSC, MICH, or MIN; † = species considered critically endangered

Species	Number of counties	Counties in	
		Upper Peninsula	Lower Peninsula
<i>Anzia colpodes</i> †	1	Luce	
<i>Arctoparmelia centrifuga</i>	2	Keweenaw, Marquette	
<i>Arctoparmelia subcentrifuga</i>	1	Keweenaw	
<i>Cladonia robbinsii</i> †	2		Newaygo, Allegan
<i>Cladonia strepsilis</i>	4		Roscommon, Benzie, Oceana
<i>Collema glebulentum</i>	1	Keweenaw	
<i>Collema polycarpon</i>	1	Keweenaw	
<i>Dermatocarpon mouliinsii</i>	2	Keweenaw, Marquette	
<i>Flavocetraria cucullata</i>	1	Keweenaw	
<i>Heterodermia obscurata</i> †	5		Washtenaw, Leelanau, Jackson, Clinton, Iosco
<i>Heterodermia leucomela</i> †	2	Keweenaw*, Alger	
<i>Hypogymnia bitteri</i>	1	Keweenaw	
<i>Hypogymnia vittata</i>	1	Marquette*	
<i>Hypotrachyna revoluta</i>	2	Keweenaw, Delta	
<i>Lobaria scrobiculata</i>	1	Keweenaw	
<i>Melanelia albertana</i> †	1		Cheboygan*
<i>Melanelia panniformis</i>	2	Keweenaw, Marquette	
<i>Melanelia tominii</i>	1	Keweenaw	
<i>Peltigera scabrosa</i> †	1		Clare*
<i>Peltigera venosa</i>	1	Keweenaw	
<i>Physcia phaea</i>	2	Keweenaw	Emmet
<i>Protopannaria pezizoides</i>	4	Keweenaw, Luce, Baraga, Delta	
<i>Pseudocyphellaria crocata</i>	1	Keweenaw	
<i>Psora decipiens</i> †	2	Keweenaw, Chippewa	
<i>Punctelia stictica</i>	1	Keweenaw	
<i>Ramalina farinacea</i>	2	Keweenaw	Cheboygan
<i>Ramalina thrausta</i>	3	Keweenaw, Delta, Chippewa	
<i>Stereocaulon pileatum</i>	1	Keweenaw	
<i>Sticta fuliginosa</i> †	1	Keweenaw	
<i>Sticta beauvoisii</i>	1	Gogebic	
<i>Teloschistes chrysophthalmus</i> †	1		Charlevoix
<i>Teloschistes flavicans</i>	1		Alpena*
<i>Umbilicaria polyphylla</i>	1	Keweenaw	
<i>Umbilicaria torrefacta</i>	2	Keweenaw, Marquette	

Counties, the two most northern counties of the Lower Peninsula. This leaves only seven species that are known from only the Lower Peninsula. Of the 27 species recorded from the Upper Peninsula, 13 have been recorded from only Keweenaw County, usually Isle Royale National Park, and a further 11 species have been recorded from Keweenaw Co. and either elsewhere in the Upper Peninsula (9) or the northern Lower Peninsula (2). Only 11 of the species on the proposed list have not been recorded from Keweenaw County, four from the Upper Peninsula and seven from the Lower (Table 2). This emphasizes the uniqueness of the lichen vegetation of Isle Royale within Michigan. However, many of the species known from only Isle Royale belong to the northern element

of the flora and are common and widespread further north. In contrast, those species known from scattered localities elsewhere in the state are often indicators of undisturbed habitats, which have a high nature conservation interest, and are more threatened by destructive management practices than those on Isle Royale. In Table 2 we have identified nine species that are probably critically threatened in Michigan.

All 34 species of lichen here identified as being threatened in Michigan have a State Rarity Ranking of S1—five or fewer records from Michigan. Global Ranking is less easy to assess although most of the species would probably be ranked at G3—rare, although locally frequent, or G4—apparently secure, although locally rare (Michigan Department of Natural Resources 2001). It should be noted that some microlichens, which are not considered here, would have a Global Ranking of G1—critically imperiled because of extreme rarity, because they are known from five or fewer records world-wide (see below).

DISCUSSION

We have restricted the list to only foliose and fruticose species (macrolichens), omitting the crustose (microlichen) species even though some of these are probably genuinely rare. For instance, *Toninia superioris* has been recorded from only Isle Royale, Keweenaw Co. (Timdal 1992), and *Caloplaca parvula* is known from only the Great Lakes region (Wetmore 1994), whereas for others (e.g. *Aspicilia grisea*, *Agonimia allobata*) the only known North American collections are from Michigan (Fryday 2001). As crustose lichens are easily overlooked and less often collected than macrolichens, their distribution patterns are poorly understood and it is possible that all these species are less rare than current records indicate. Consequently, we feel that any attempt to designate any crustose species as “threatened” would be premature. However, we have included the squamulose species *Psora decipiens*, because it is a distinctive species with a specialized habitat (base-rich soil) and is less likely to be overlooked than most microlichens.

Four records are not supported by a specimen in MIN, MSC or MICH (Table 2). These are literature references, taken from Harris 1977 (*Melanelia albertana*, *Peltigera scabrosa*, *Teloschistes flavicans*) or Manierre 1999 (*Hypogymnia vitata*). Specimens supporting the Harris records are probably held in the herbarium of the University of Michigan Biological Station, Cheboygan County, and the Manierre record is supported by a specimen in the private collection of the Huron Mountain Club, Marquette County.

In addition to their intrinsic value, lichens are important biological indicators of undisturbed habitats. Many species have a need for ecological continuity of habitat, because of their poor recolonizing ability, and are, as such, excellent indicators of important habitats such as old-growth forests or unmanaged prairies. Several species on the list are in this category (e.g. *Cladonia robbinsii*, *Lobaria scrobiculata*, *Sticta fuliginosa*). Also, although it is not considered threatened in Michigan, *Menegazzia terebata* is a species with an Appalachian/Great Lakes

distribution that is restricted to old-growth forests. Therefore, it is a useful indicator species for this type of habitat, which have potential for yielding species that are on the threatened list.

The total number of accessioned Michigan collections in MIN, MSC and MICH is around 35,000, although many thousands more are unprocessed. There has also been little organized fieldwork in the state in recent years. Along with the recent lichen checklist for the state (Fryday et al. 2001), the production of this list of threatened species is a further step towards the serious study of this neglected group of organisms in Michigan.

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LITERATURE CITED

- Brodo, I. M., S. D. Sharnoff, & S. Sharnoff. 2001. Lichens of North America. New Haven & London: Yale University Press.
- Fryday, A.M., J. B. Fair, M. S. Googe, A. J. Johnson, E. A. Bunting, & L. A. Prather. 2001. Checklist of lichens and allied fungi from Michigan. Contributions from the University of Michigan Herbarium 23: 145–223.
- Fryday, A. M. 2001. Additions to the lichen flora of North America—*Agonimia allobata* and *Aspicilia grisea*. Evansia 18: 87–89.
- Harris, R. C. 1977. Lichens of the Straits Counties, Michigan. Published by the author.
- Manierre, W. R. 1999. Bryophytes and lichens of the Huron Mountain Club. Evansia 16: 153–166.
- Michigan Department of Natural Resources. 2001. Natural Features Inventory. <http://www.dnr.state.mi.us/wildlife/heritage/mnfi/>
- Timdal, E. 1992. A monograph of the genus *Toninia* (Lecideaceae, Ascomycetes). Opera Botanica 110: 1–137.
- Wetmore, C. M. 1994. The lichen genus *Caloplaca* in North and Central America with brown or black apothecia. Mycologia 86: 813–838.
- Wetmore, C. M. 1997. Biological Resource Division, US Geological Survey; Lichens. <http://www.ies.wisc.edu/brd/lichen.htm>.